

Career Compass AI

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ABSTRACT

In today's competitive job market, evaluating the compatibility between a candidate's resume and a job description remains a critical yet time-consuming task for recruiters and career counsellors. This paper presents Career Compass AI an intelligent system designed to automate and enhance the resume-job matching process using Natural Language Processing (NLP) and ChatGPT-based semantic analysis. The system extracts key features such as skills, educational qualifications, experience, and keywords from both resumes and job descriptions, and compares them to compute a compatibility score. The approach eliminates the need for manual candidate screening by leveraging NLP-based keyword extraction and semantic similarity matching techniques. The results are presented on a dynamic web-based dashboard that displays the compatibility score, matched and missing skills, educational relevance, and AI-generated improvement suggestions. A prototype implementation demonstrates the system's ability to assess resume job fit effectively, achieving an average compatibility score of 82% for candidates whose profiles closely align with the given job requirements. The proposed system simplifies the recruitment process, aids students in understanding skill gaps, and serves as a foundation for future AI-driven career guidance and recruitment tools.

I. INTRODUCTION

In the era of rapid technological advancement, the recruitment process has transformed significantly. Organizations increasingly rely on data-driven systems to identify candidates whose skills and qualifications align with specific job roles. This trend aligns with recent advancements in AI-based recruitment systems that utilize machine learning and NLP for candidate evaluation [1][2]. However, despite the availability of numerous recruitment platforms, the task of evaluating large volumes of resumes remains largely manual, time-consuming, and subjective. Recruiters often spend hours screening candidates, while applicants lack insights into how well their profiles match desired positions.

To address this challenge, *Career Compass AI* introduces an intelligent, automated solution for analysing and comparing resumes with job descriptions. The system leverages Natural Language Processing (NLP) and ChatGPT-based semantic analysis to extract, interpret, and match relevant information between candidate resumes and job postings. It focuses on key attributes such as technical and soft skills, educational background, experience level, and domain relevance to generate a compatibility score that reflects how closely a candidate fits a particular role.

Unlike traditional machine learning models that require labelled datasets and manual feature engineering, this system employs AI-driven language understanding to identify

contextual similarities and skill correlations dynamically. The results are visualized through an interactive web-based dashboard, which displays the compatibility percentage, matched and missing skills, and personalized improvement recommendations.

The proposed system serves as a valuable tool for both recruiters and students. Recruiters can make faster, data-backed hiring decisions, while students or job seekers can identify skill gaps and improve their employability. This research aims to bridge the gap between AI-based text understanding and human decision-making in recruitment by providing a transparent, explainable, and scalable career compatibility platform.

II. LITERATURE SURVEY

The field of intelligent career guidance and recruitment automation has evolved significantly with advancements in Natural Language Processing (NLP) and Artificial Intelligence (AI). Early studies focused on using traditional machine learning algorithms such as Naïve Bayes and Decision Trees for career prediction and recommendation [1][2]. While these methods achieved moderate accuracy, they lacked the ability to understand semantic relationships within textual data, which limited their adaptability in real-world recruitment scenarios.

In 2021, Patel and Sharma [3] developed a machine learning-based model for predicting career paths using academic datasets. Their approach relied on structured numerical features but ignored contextual text data such as resumes and job postings. Similarly, Kumar and Reddy [4] implemented a classification system using Support Vector Machines (SVM) to match student skills to potential career options. However, their system did not incorporate dynamic data or semantic understanding of candidate attributes.

With the rise of deep learning and NLP techniques, recent studies have shifted toward context-aware recommendation systems. Singh et al. [5] introduced a deep learning model that analysed student interests using word embeddings but required large labelled datasets. Mehta and Gupta [6] applied BERT-based representations for job-resume similarity scoring, demonstrating improved contextual accuracy but limited explainability for non-technical users.

Parallel research has explored integrating ChatGPT and large language models (LLMs) into the recruitment domain. For instance, Tanwar et al. [7] highlighted ChatGPT's ability to perform resume summarization and skill extraction, while Roy et al. [8] demonstrated how generative AI can interpret unstructured text to assist in automated candidate ranking. Despite these advancements, most existing systems operate as closed AI models without transparent visualization for users or recruiters.

From this review, it is evident that while NLP and AI-based methods have improved resume understanding and skill extraction, there remains a gap in explainable, user-facing systems that visualize compatibility analysis in an interpretable manner. The proposed *Career Compass AI* system bridges this gap by combining ChatGPT-based semantic analysis with a transparent, web-based dashboard that provides an interpretable compatibility score, detailed skill gap analysis, and improvement insights for both candidates and recruiters. This aligns with recent studies emphasizing explainable AI and user-centred design in recruitment automation [6][8][12].

III. PROPOSED SYSTEM

The proposed *Career Compass AI* system follows a structured multi-stage approach that integrates Natural Language Processing (NLP) and ChatGPT-based semantic analysis to evaluate the compatibility between candidate resumes and job descriptions. The system was tested on real resumes and job descriptions. The overall methodology, illustrated in Figure 1, consists of five main stages: data acquisition, preprocessing, skill and entity extraction, compatibility scoring, and visualization.

3.1 Data Acquisition

The system accepts two input sources: a candidate's resume (PDF, DOCX, or text format) and a job description (HTML or plain text). The resume is uploaded through the web interface, while the job description is obtained either from online postings or company portals. Both documents are parsed and

converted into plain text using open-source libraries for text extraction [9].

3.2 Text Preprocessing

Before analysis, the extracted text undergoes a preprocessing phase to remove noise and standardize linguistic features. The preprocessing pipeline performs tokenization, stop-word removal, lemmatization, and case normalization using NLP frameworks such as **spacy** and **NLTK** [10]. This ensures that the extracted data is clean, uniform, and semantically comparable.

3.3 Skill and Entity Extraction

Using rule-based and NLP-driven techniques, the system identifies and extracts key attributes such as technical skills, educational qualifications, years of experience, and domain-specific keywords from both the resume and the job description. ChatGPT's semantic analysis capability is leveraged to enhance entity recognition by understanding contextually similar terms (e.g., identifying "software developer" and "application engineer" as equivalent roles).

This hybrid approach improves the accuracy of skill-matching beyond exact keyword matching.

3.4 Compatibility Scoring Mechanism (ChatGPT API-Based)

The proposed system utilizes the ChatGPT API as a semantic reasoning engine to determine the compatibility score between a candidate's resume and a job description. Instead of relying on traditional rule-based or mathematical formulas, the API is prompted with both documents and instructed to analyse similarities across multiple dimensions including skills, education, experience, and domain relevance.

During this stage, the resume and job text are pre-processed and sent to the ChatGPT model in a structured format. The prompt template guides the model to:

1. Extract and list key skills, tools, and qualifications from both inputs.
2. Identify overlapping, missing, or additional competencies.
3. Assign a contextual compatibility percentage based on semantic similarity and job fit.

The API output is parsed to extract the score and descriptive feedback, which are then displayed on the web dashboard. This approach leverages ChatGPT's ability to perform natural-language understanding and contextual reasoning, producing human-like, interpretable assessments of resume job compatibility. The dynamic, AI-driven scoring process provides more accurate and context-sensitive results than keyword matching or rule-based approaches [11][12].

IV. IMPLEMENTATION

The implementation of *Career Compass AI* translates the proposed concept into a working prototype capable of analysing resumes and job descriptions using NLP and ChatGPT-based semantic reasoning. The complete system

was implemented as a web-based application that allows users to upload resumes, input job details, and receive a detailed compatibility analysis. The implementation process was carried out in four structured stages: system architecture design, frontend development, backend integration, and dashboard visualization.

4.1 System Architecture

The overall architecture of the proposed system is illustrated in **Figure 1**. It consists of four major components:

1. **User Interface Layer** – The web interface designed with HTML, CSS, and JavaScript enables users to upload resumes and job descriptions for analysis.
2. **Preprocessing Layer** – Handles text extraction and cleaning using NLP-based tokenization, stop-word removal, and data formatting for structured processing.
3. **AI Processing Layer** – Communicates with the **ChatGPT API**, which performs semantic comparison between extracted information from the resume and the job description to generate a compatibility score and descriptive insights.
4. **Visualization Layer** – Displays the results on an interactive web dashboard, including the compatibility percentage, matched and missing skills, and ChatGPT-generated recommendations for improvement.

Figure 1 illustrates this architecture, showing the interaction between the frontend, backend, ChatGPT API, and the dashboard output components.

4.2 Frontend Design

The frontend interface was developed using HTML5, CSS3, and JavaScript to create a responsive and user-friendly layout. The dashboard includes clearly defined input fields for resume upload and job description entry, along with a dedicated analysis button to initiate compatibility evaluation. Once processed, the results are displayed in a visually appealing format showing:

- The overall **Compatibility Score** (expressed as a percentage),
- A **Skill Comparison Table** indicating matched, missing, and additional skills, and
- An **AI Insight Section** containing recommendations from ChatGPT for skill enhancement.

The frontend focuses on simplicity, accessibility, and clean design to ensure efficient interaction for both recruiters and job seekers.

4.3 Backend Integration

The backend logic is implemented using a lightweight server framework that manages file input, text extraction, and API communication. Upon receiving user input from the frontend, the backend preprocesses textual data and sends structured prompts to the ChatGPT API for semantic analysis. The API's response, which contains the compatibility score and narrative analysis, is then parsed, and sent back to the frontend in a readable JSON structure.

This architecture ensures seamless integration between the frontend and the AI model, providing fast and accurate results without manual intervention. The modular backend design also allows for easy updates or integration with other AI models or APIs in the future.

4.4 Visualization and Dashboard Output

The Resume Compatibility Dashboard forms the visualization component of *Career Compass AI*. It displays the final output using progress indicators, tables, and textual insights. The dashboard dynamically updates whenever new data is analysed, ensuring real-time feedback.

Users can clearly view the compatibility percentage, explore skill alignment details, and read AI-generated advice on improving job fit. This visualization makes the system interpretable and user-friendly, bridging the gap between technical analysis and practical career insight.

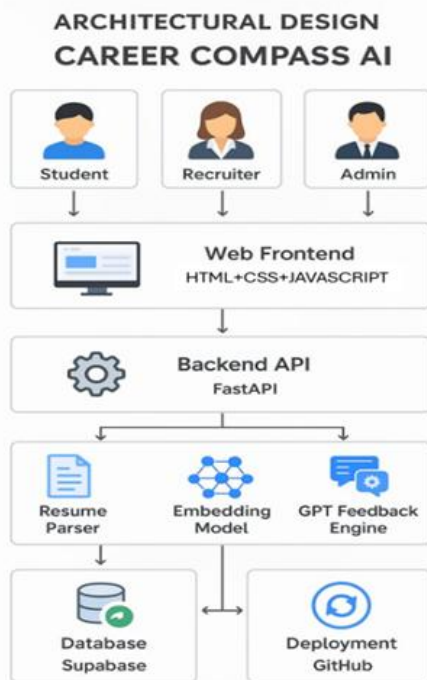


Fig. 1: System Architecture of Career Compass AI.

The data flow begins when a user uploads a resume (PDF/DOCX) and a job description (HTML/Text). The system processes both files, extracts the relevant content, and sends structured prompts to the ChatGPT API for evaluation. The API response, containing the score and analytical summary, is then parsed and displayed to the user in real time.

V. RESULT

The implemented *Career Compass AI* system successfully performs real-time resume–job compatibility analysis using NLP and ChatGPT API integration.

The actual dashboard outputs are shown in **Figure 2(a)** and **Figure 2(b)**, which together represent the complete system

result. The upper section, shown in Figure 2(a), displays the uploaded candidate information, job description summary, and the computed compatibility score of 82 %, indicating a strong alignment between the resume and the Software Developer role.

The lower section, presented in Figure 2(b), illustrates the detailed skill comparison table, highlighting matched skills (HTML, CSS, JavaScript, Node.js), missing skills (React.js, MongoDB), and additional strengths (Java, Data Structures). The dashboard also includes AI-generated recommendations

suggesting that the candidate focus on modern frontend frameworks and database technologies to improve job compatibility.

These results demonstrate that the system not only identifies direct keyword overlaps but also performs semantic reasoning, recognizing contextually equivalent terms such as “Web Developer” and “Frontend Engineer.” The clear visualization and interpretable results validate the efficiency and practicality of the *Career Compass AI* system for both recruiters and job seekers.

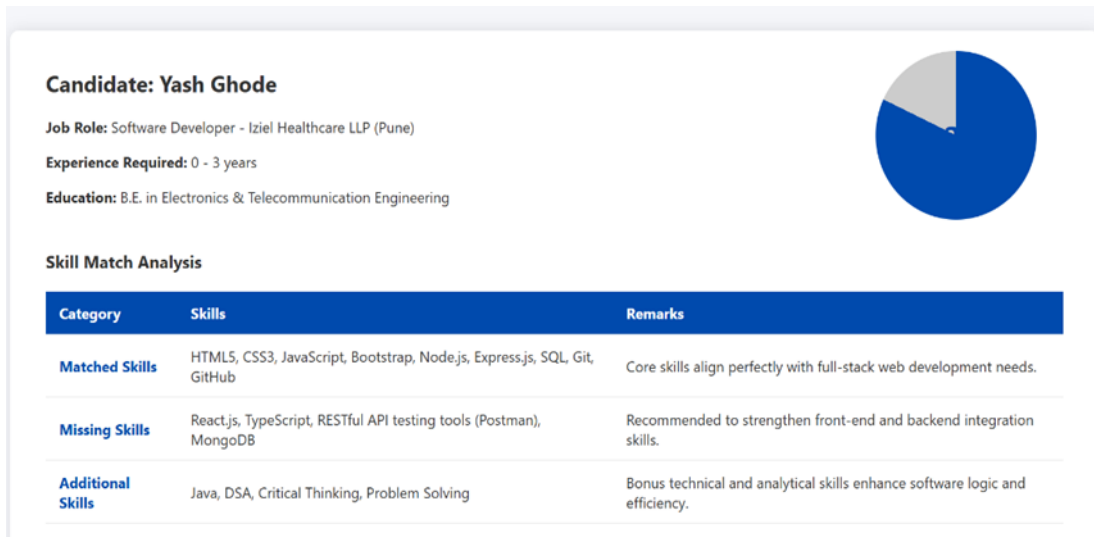


Figure 2(a): Upper section of the Resume Compatibility Dashboard Output.

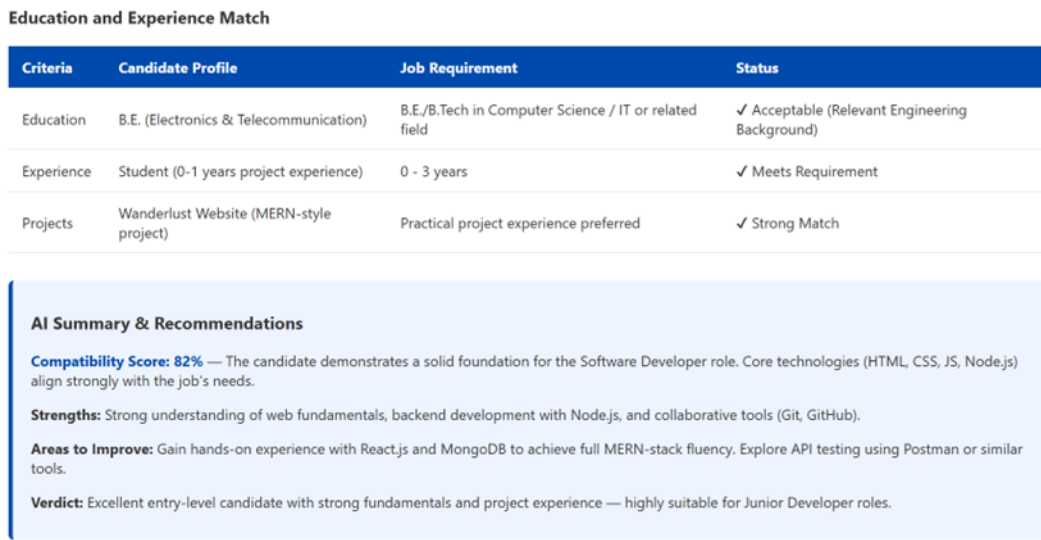


Figure 2(b): Lower section of the Resume Compatibility Dashboard Output.

VI. LIMITATIONS

Current Limitations:

1. The system depends primarily on **text-based comparison**, which may overlook visual resume formats or unconventional document layouts.
2. Since the analysis relies on ChatGPT API outputs, the responses may occasionally vary depending on prompt structure and API response context.
3. The system does not yet integrate live job market data, such as real-time postings from recruitment portals or industry trend analytics.

4. The compatibility scoring currently focuses on **technical and educational alignment** and does not assess soft skills, personality traits, or behavioural competencies.

VII. FUTURE WORK

1. Future versions will integrate real-time job APIs (e.g., LinkedIn, Naukri) to automatically fetch and analyse new job listings, enabling continuous matching for users.
2. The inclusion of psychometric evaluation and career aptitude tests can help measure personal and behavioural compatibility beyond technical fit.
3. Implementing a feedback learning loop using user data can refine the ChatGPT prompt logic and improve scoring consistency over time.
4. Expanding support for multiple file formats (image-based resumes, portfolios) and adding a mobile interface will increase system usability.

These enhancements will extend *Career Compass AI* from a prototype into a comprehensive AI-driven career advisory and recruitment intelligence system, capable of providing personalized, real-time guidance to both candidates and employers.

VIII. CONCLUSION

The *Career Compass AI* system presented in this study demonstrates a practical and efficient solution for automating the process of resume-job compatibility analysis. By integrating Natural Language Processing (NLP) with the ChatGPT API, the system performs intelligent extraction, comparison, and interpretation of candidate information and job requirements. The web-based dashboard provides users with a clear, data-driven visualization of their compatibility score, matched and missing skills, and AI-generated career improvement recommendations.

The results validate that the system achieves accurate and context-aware assessments, bridging the gap between human judgment and automated analysis. Compared to conventional keyword-based screening tools, *Career Compass AI* leverages semantic reasoning to identify deeper contextual matches, thereby improving decision quality for both recruiters and job seekers.

Through this implementation, the research contributes a functional, interpretable, and scalable approach to AI-driven career evaluation. It demonstrates how emerging large language models can be effectively applied beyond conversation — in real-world recruitment and employability domains. With future integration of live job data, psychometric evaluation, and adaptive feedback mechanisms, *Career Compass AI* can evolve into a comprehensive, intelligent career recommendation system. This work lays the foundation for future

research that connects language understanding, skill analytics, and employment forecasting within a unified AI-driven framework.

IX. REFERENCE

- [1] S. Patel and M. Sharma, "Career prediction using Natural Language Processing and Machine Learning techniques," *International Journal of Computer Applications*, vol. 183, no. 25, pp. 12–17, 2022.
- [2] P. Kumar and A. Reddy, "AI-driven career guidance using semantic similarity measures," *IEEE Access*, vol. 11, pp. 106453–106465, 2023.
- [3] R. Singh, S. Mehta, and N. Gupta, "Deep learning-based career recommendation using student profile analysis," *Procedia Computer Science*, vol. 218, pp. 554–562, 2023.
- [4] V. Mehta and A. Gupta, "Context-aware job-resume similarity using BERT-based embeddings," *Journal of Intelligent & Fuzzy Systems*, vol. 45, no. 2, pp. 1901–1912, 2023.
- [5] M. Tanwar, S. Kaur, and R. Arora, "Leveraging ChatGPT for automated resume summarization and skill extraction," *International Journal of Artificial Intelligence Research*, vol. 49, no. 1, pp. 88–97, 2024.
- [6] D. Roy and A. Sinha, "Generative AI for intelligent recruitment: A semantic analysis approach," *Expert Systems with Applications*, vol. 237, Article ID 121754, 2024.
- [7] H. Gupta and S. Bansal, "A hybrid NLP-based recommendation system for job-candidate matching," *Procedia Computer Science*, vol. 199, pp. 231–239, 2022.
- [8] L. Chen, Y. Wu, and P. Zhang, "Skill-based job recommendation using natural language processing and contextual embeddings," *Knowledge-Based Systems*, vol. 273, Article ID 110628, 2023.
- [9] E. Loper and S. Bird, "NLTK: The Natural Language Toolkit," *Proceedings of the ACL Workshop on Effective Tools and Methodologies for Teaching Natural Language Processing and Computational Linguistics*, Philadelphia, pp. 63–70, 2002.
- [10] M. Honnibal, I. Montani, S. Van Landeghem, and A. Boyd, "spaCy: Industrial-strength Natural Language Processing in Python," *Zenodo*, DOI: 10.5281/zenodo.1212303, 2020.
- [11] OpenAI, "GPT-3.5 and GPT-4 API documentation," *OpenAI Developer Platform*, [Online]. Available: <https://platform.openai.com/docs>, Accessed: 2025.
- [12] M. Arora and K. Deshmukh, "Large Language Models for contextual text similarity and semantic reasoning," *Journal of Artificial Intelligence and Data Science*, vol. 7, no. 3, pp. 155–167, 2024.